REMARKS

Introduction

As a preliminary matter, the Examiner is respectfully requested to acknowledge Applicant's claim to foreign priority and receipt of the certified copy of the priority document in the next PTO paper. The NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.496 states that the priority document filed 01/24/2006 has been received by the USPTO.

Applicant responds to the Office Action dated August 3, 2007, hereinafter. It is earnestly submitted that by the amendment of claim 8 herein, and consideration of the "remarks" and comparative experimentation in the application as filed with respect to the prior art rejections, that all claims will be found to be in allowable condition.

The claim objection

In paragraph 2 of the Office Action, claim 8 is objected to as being unclear regarding the reduction in absorbance at 910nm. Claim 8 has been amended to clearly recite that the reduction is "up to 70%." Thus, the reduction is 70% or less. Reconsideration and withdrawal of the objection are respectfully requested.

The prior art rejections based on Sakunaga et al

In paragraph 6 of the Office Action, claims 5 – 8 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as being obvious over Sakunaga et al.

Claims 5 – 8 all depend directly or indirectly upon claim 1. Claim 5 claims a polymer produced by polymerization of a composition comprising the compound of claim 1. Claim 6 recites that the polymer of claim 5 contains at least 50% heavy hydrogen atoms. Claims 7 and 8 are directed to optical members comprising a region formed of the claim 5 polymer, with claim 8 specifying that the optical member gives an absorbance at 910nm up to 70% of that by a polymer having the same structure except that all its hydrogen atoms are light hydrogen atoms. Therefore, it is necessary to critically compare the prior art of Sakunaga et al with polymerization products produced from the compound of claim 1.

In the compound [1] of claim 1, four or more hydrogen atoms in the R^4 norbornyl group are heavy hydrogen atoms. By employing a polymer containing the claimed monomer, it becomes possible to provide the claimed polymer and optical members containing the polymer exhibiting high transparency and low propagating-light loss. These features and advantages of the present invention are illustrated by the Examples and Comparative Examples in the present application, with data therefrom being set forth in Fig. 1 of the Drawing.

In Example No. 1, at pages 23 – 24 of the application, a compound of formula [1] of claim 1 is produced from deuterated norborneol prepared by Referential Example No. 2 (pages 22 – 23 of the application) and having an average deuteration content of 66.8%. This compound is referred to as "WDM-3." In Example No. 4 at page 25 of the application, WDM-3 monomer is polymerized into a polymer rod having both end portions cut off by a diamond cutter and the cut surface polished optically. Thus, Example No. 4 is a rod formed of norbornyl methacrylate deuterated at 66.8% in the norbornyl moiety.

Comparative Example Nos. 1 and 2 are described at pages 25 – 26 of the application. In these comparative examples, two polymer rods were produced respectively in the same manner

as Example No. 4, except for using monomer NBXMA (norbornyl methacrylate which is not deuterated) and monomer NBXMA-d5 (norbornyl methacrylate deuterated at 31.3% in the main chain methacrylic acid moiety and not deuterated in the side chain corresponding to R^4 in formula [1]). As shown in Fig. 1 of the Drawing, the polymer rod of Example No. 4 provides a much smaller absorption attributed to the fourth C-H overtone at about 730nm or about 910nm as compared with the polymer rods of Comparative Example Nos. 1 and 2. These results suggest that when an optical fiber to propagate light emitted from a commercially available 850nm light source is produced by polymerization of a composition comprising the inventive WDM-3, the optical fiber exhibits a high transparency and low propagating-light loss because the bottom of the absorption band at 910nm has little influence on propagating-light loss. Furthermore, the results as set forth in Fig. 1 reveal that, although both of WDM-3 and NBXMA-d5 polymers are deuterated polymers of norbornyl methacrylate (WDM-3 is within the claims and NBXMA-d5 is not within the claims because its norbornyl moiety, corresponding to R^4 in claim 1, is not deuterated), WDM-3 is superior to NBXMA-d5 in terms of transparency and further in propagating light-loss.

Turning to Sakanuga et al, the Examiner appears to rely primarily upon col. 5, ll. 30 – 50 of the reference. There, the reference states that amorphous transparent polymers are preferably used as the core of the optical filaments of the reference. The reference goes on to recommend many different kinds of polymers, including, for example, methyl methacrylate homopolymer and copolymers; copolymers of a methacrylic acid ester such as cyclohexyl methacrylate, t-butyl methacrylate, norbornyl methacrylate, adamantyl methacrylate, benzyl methacrylate, etc.; polycarbonates; polystyrenes; styrene/methacrylic acid copolymer and deuteration products of

any of the listed polymer types formed by substituting all or parts of the hydrogen atoms of the polymers with deuterium atoms.

For an anticipation rejection to lie, each and every element of the rejected claim must be found within the reference. Here, the reference simply lists at least thousands of polymer possibilities (and probably even a greater number when the vast degree of possible deuteration is considered) without setting forth any specific polymer which would fall within claims 5 or 6 (or the optical members of claims 7 and 8 comprising the polymer of claim 5), because the reference does not set forth a specific compound of the formula [1] of claim 1. Therefore, reconsideration and withdrawal of the anticipation rejection based on Sakunaga et al are respectfully requested.

Turning to the obviousness rejection based on Sakunaga et al, Applicant respectfully submits that the comparative experimentation in the application as filed, as discussed above, is more than sufficient to overcome the 103(a) rejection. Sakunaga et al merely recites that deuteration products of polymers are formed by substituting all or parts of hydrogen atoms of the polymers by deuterium atoms, without even disclosing exactly what moieties of the polymers may undergo such substitution. Applicant submits that the skilled artisan could never have expected the unexpected superiority of the polymer rods of the present invention in comparison with the effect achieved, for example, with the deuterated polymer NBXMA-d5, which can be considered as within the broad teachings of the reference. Fig. 1 of the Drawing, without question, establishes the significance of the present invention as set forth in claims 5 – 8, where the R^4 norbornyl group of formula [1] of claim 1 contains four or more heavy hydrogen atoms. This feature is not suggested nor taught by Sakunaga et al. The obviousness rejection based on Sakunaga et al should be reconsidered and withdrawn.

The prior art rejection based on Kobayashi et al in view of Koike

In paragraph 7 of the Office Action, claims 1 – 4 are rejected under 35 U.S.C. 103(a) as being unpatentable (obvious) over Kobayashi et al in view of Koike. Kobayashi et al is cited as disclosing the existence of norbornyl methacrylate with all light hydrogen atoms, prepared by a condensation reaction of norborneol with methacrylic acid, and use of the polymers thereof as optical resins. Thus, Kobayashi et al is completely silent on deuteration of norbornyl methacrylate and does not teach or suggest such a deuterated compound or polymers prepared therefrom. The secondary reference of Koike is cited as teaching that threshold transmission loss values are improved by replacing a C-H bond with a C-D bond in optical resins. Koike mentions as such a polymer containing the C-D bond the polymer formed from the monomer MMA-d8, without mentioning any specific method for producing such a monomer or polymer.

Known deuterated monomers such as MMA-d8 are generally produced according to a hydrogen-dueterium exhange method. According to this known method, a molecular compound containing oxygen is placed in an alkali solvent containing D_2O and then hydrogen in the molecule is exchanged with deuterium present around the molecule. An oxygen/carbon/hydrogen resonance is formed in the solvent and hydrogen is easily released from the molecule and replaced by deuterium present in the solvent. However, this oxygen/carbon/hydrogen resonance does not occur in such a solvent when norbornyl methacrylate is the molecule. In contrast with these generalized procedures, the Applicant herein deuterates norborneol in the presence of palladium carbon catalysis, and then using this deuterated norborneol, produces norbornyl methacrylate. See Referential Example No. 3 at page 23 of the application. This procedure is not in any of the cited references. One skilled in the art would not have known how to deuterate the compound of Kobayashi et al at the time the present

invention was made, and certainly not so from the scant disclosure of Koike. Thus, it would not have been obvious to the skilled artisan to produce the compound of claim 1 from the known compound of Kobayashi et al. Further, the comparative experimentation in the application as discussed above, is also relevant to this rejection in clearly showing the unexpected superiority of the present invention in terms of high transparency and low propagating-light loss, as flowing from the compound of claim 1, as compared with the generalized suggestion of a deuterated polymer in Koike. Reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) based on Kobayashi et al in view of Koike are respectfully requested.

Conclusion

Allowance is respectfully requested. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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